

MBM

INTELLECTUAL PROPERTY LAW

**BY FACSIMILE
CONFIRMATION BY COURIER**

FAX: 011 41 22 740-1435

April 26, 2004

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20
Switzerland

Re: PCT Application No. PCT/CA03/01229
Lorus Therapeutics Inc. *et al.*
Our File: 335-148PCT

FILING OF AMENDMENTS AND STATEMENT UNDER ARTICLE 19

Dear Sir/Madam:

This communication is in response to the International Search Report mailed February 26, 2004. The Applicant wishes to amend the application, under Article 19 of the Patent Cooperation Treaty, as follows:

IN THE CLAIMS

Please replace claims 1 to 20, presently on file, with new claims 1 to 25, submitted herewith on new pages 73-87. Claims 1, 4, 10, 12 and 16 have been subdivided into amended claims 1 and 2, 5 and 6, 12 and 13, 15 and 16, and 20 and 21, respectively; claims 2, 3, 5-9, 11, 13-15, 17 and 18 have been replaced with amended claims 3, 4, 7-11, 14, 17-19, 22 and 23, respectively; claims 19 and 20 are unchanged but have been renumbered as claims 24 and 25, respectively.

mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

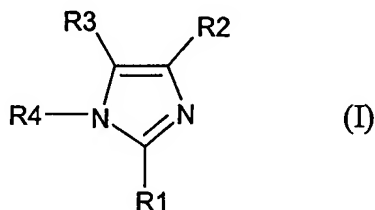
MARUSYK MILLER & SWAIN LLP*

/ • MBM & Co.TM **BEST AVAILABLE COPY**

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

A first set of new claims reflecting the changes with added wording being indicated by the use of underlining and deleted wording being indicated within square brackets is submitted herewith below. Applicants have also enclosed a second set of said new claims in final format.

1. (Amended) [Use of a compound having structural formula (I), or a salt thereof, as an anti-microbial agent,] A compound having structural formula (I):



wherein:

R1 is aryl, substituted aryl[,heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl];

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl,[or] substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano, for use as an anti-microbial agent.

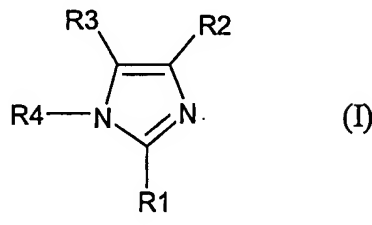
mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.†

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

2. (New) A compound having structural formula (I):



wherein:

R1 is heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

for use as an anti-microbial agent;

with the proviso that when R1 is 3-indolyl or substituted 3-indolyl, and R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl then said compound is for use as an anti-fungal agent.

3[2]. (Amended) The [use] compound according to claim 1 or 2, wherein said anti-microbial agent is for the treatment or prevention of a microbial infection in an animal in need thereof.

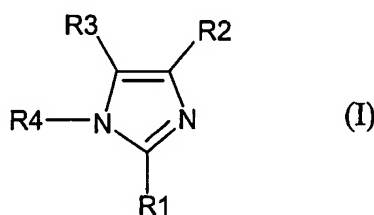
mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / . MBM & Co.[†]

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

- 4[3]. (Amended) The [use] compound according to claim 1 or 2, wherein said anti-microbial agent is formulated for incorporation into a cosmetic product, personal care product, cleanser, polish, paint, spray, soap, or detergent.
- 5[4]. (Amended) [Use of a compound having structural formula (I), or a salt thereof, in the treatment or prevention of a microbial infection, or a disease or disorder associated therewith, in an animal in need of such therapy,] A compound having structural formula (I), or a salt thereof:



wherein:

R1 is aryl, substituted aryl[, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl];

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl,[or] substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

mbm.com

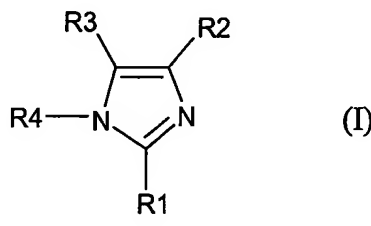
OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.†

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

for use in the treatment or prevention of a microbial infection, or a disease or disorder associated therewith.

6. (New) A compound having structural formula (I), or a salt thereof:



wherein:

R1 is heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

for use in the treatment or prevention of a microbial infection, or a disease or disorder associated therewith;

with the proviso that when R1 is 3-indolyl or substituted 3-indolyl, and R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl then said microbial infection is a fungal infection.

mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.†

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

- 7[5]. (Amended) The [use] compound according to claim [4] 5 or 6, wherein said compound of structural formula I is used in combination with one or more anti-microbial agent(s).
- 8[6]. (Amended) The [use] compound according to [claim 4 or 5] any one of claims 5, 6 or 7, wherein said microbial infection, or disease or disorder associated therewith, is a bacterial infection, or disease or disorder associated therewith.
- 9[7]. (Amended) The [use] compound according to [claim 4 or 5] any one of claims 5, 6 or 7, wherein said microbial infection, or disease or disorder associated therewith, is a fungal infection, or disease or disorder associated therewith.
- 10[8]. (Amended) The [use] compound according to claim [6] 8, wherein said bacterial infection, or disease or disorder associated therewith, is caused by *Corynebacterium xerosis*, *Chlamydia pneumoniae*, *Chlamydia trachomatis*, *Enterobacter cloacae*, *Enterobacter faecalis*, *Enterococcus faecium*, *Escherichia coli*, *Escherichia coli* O157:H7, *Haemophilus influenzae*, *Helicobacter pylori*, *Listeria monocytogenes*, *Moraxella catarrhalis*, *Neisseria gonorrhoeae*, *Neisseria meningitidis*, *Pseudomonas aeruginosa*, *Pneumococci species*, *Salmonella enterica*, *Salmonella typhimurium*, *Staphylococcus aureus*, *Staphylococcus aureus* K147, *Staphylococcus epidermidis*, *Staphylococcus typhimurium*, *Streptococcus mitis*, *Streptococcus pneumoniae*, *Streptococcus pyogenes*, *Vibrio cholerae*, *Mycobacterium tuberculosis*, *Mycobacterium africanum*, *Mycobacterium avium-intracellulare*, *Mycobacterium pneumoniae*, *Mycobacterium bovis*, *Mycobacterium leprae*, *Mycobacterium phlei* or *Bacillus anthracis*.
- 11[9]. (Amended) The [use] compound according to claim [7] 9, wherein said fungal infection, or disease or disorder associated therewith, is caused by *Histoplasma*, *Coccidioides*, *Blastomyces*, *Paracoccidioides*, *Cryptococcus*, *Aspergillus*, *Zygomycetes*, *Basidiobolus*, *Conidiobolus*, *Rhizopus*, *Mucor*, *Absidia*, *Mortierella*, *Cunninghamella*, *Saksenaea*,

mbm.com

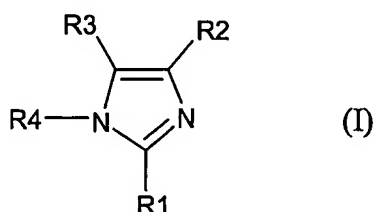
OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.[†]

* Limited Liability Partnership under the laws of Ontario / [†] Patent and Trademark Agents

Candida, *Cryptosporidium parvum*, *Sporothrix schenckii*, *Piedraia hortae*, *Trichosporon beigelii*, *Malassezia furfur*, *Phialophora verrucosa*, *Fonsecae pedrosoi*, *Madurella mycetomatis* or *Pneumocystis carinii*.

12[10].(Amended) Use of a compound having structural formula (I), or a salt thereof, in the preparation of an anti-microbial composition:



wherein:

R1 is aryl, substituted aryl[, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl];

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl[or], substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkylalkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano.

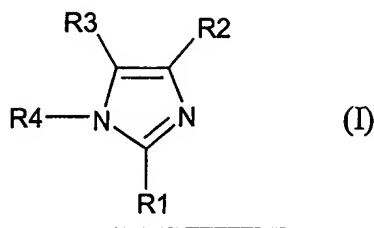
13. (New) Use of a compound having structural formula (I), or a salt thereof, in the preparation of an anti-microbial composition:

mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.†

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents



wherein:

R1 is heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

with the proviso that when R1 is 3-indolyl or substituted 3-indolyl, and R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, then said anti-microbial composition is an anti-fungal composition.

14[11].(Amended) The use according to claim [10] 13, wherein said anti-microbial composition further comprises one or more anti-microbial agent(s).

15[12].(Amended) A method of inhibiting the growth and/or proliferation of a microbial cell comprising contacting said microbial cell with an effective amount of a compound having

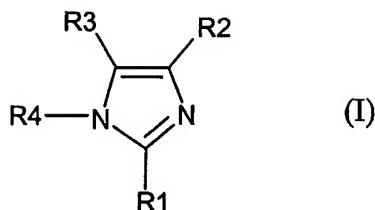
mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.†

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

general formula (I), or a salt thereof:



wherein:

R1 is aryl, substituted aryl[, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl];

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl[or], substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano.

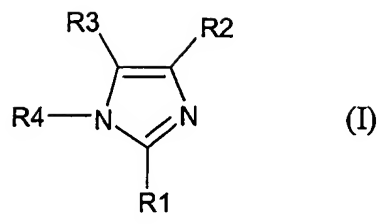
16. (New) A method of inhibiting the growth and/or proliferation of a microbial cell comprising contacting said microbial cell with an effective amount of a compound having general formula (I), or a salt thereof:

mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.†

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents



wherein:

R1 is heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

with the proviso that when R1 is 3-indolyl or substituted 3-indolyl, and R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, then said microbial cell is a fungal cell.

17[13].(Amended) The method according to claim [12] 15 or 16, further comprising contacting said cell with one or more anti-microbial agent(s).

18[14].(Amended) The method according to[claim 12 or 13] any one of claims 15, 16 or 17, wherein said microbial cell is a bacterial cell.

mbm.com

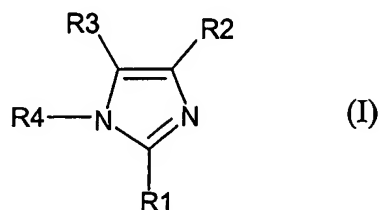
OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.†

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

19[15].(Amended) The method according to [claim 12 or 13] any one of claims 15, 16 or 17, wherein said microbial cell is a fungal cell.

20[16].(Amended) An anti-microbial composition comprising an effective amount of a compound having structural formula (I), or a salt thereof, and a carrier, diluent or excipient[,]:



wherein:

R1 aryl, substituted aryl[, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl];

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl[or], substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano.

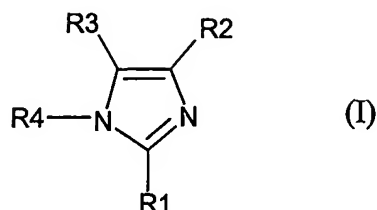
mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.†

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

21. (New) An anti-microbial composition comprising an effective amount of a compound having structural formula (I), or a salt thereof, and a carrier, diluent or excipient:



wherein:

R1 is heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

with the proviso that when R1 is 3-indolyl or substituted 3-indolyl, and R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, then said anti-microbial composition is an anti-fungal composition.

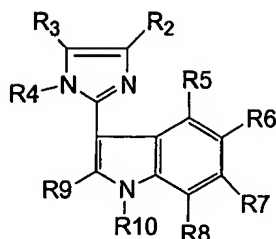
- 22[17]. (Amended) A compound having the structural formula:

mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.[†]

* Limited Liability Partnership under the laws of Ontario / [†] Patent and Trademark Agents



II

or a salt thereof, wherein:

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl [or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl or substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl];

R4, R5, R6, R7, R8 and R9 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

R10 is H, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, acyl, -CH₂-aryl, -CH₂-heteroaryl;

with the proviso that the compounds are other than:

4,5-Bis(4-methoxyphenyl)-2-(3-indolyl)imidazole;

3-(4,5-diphenyl-1H-imidazol-2-yl)-1-methyl-1H-indole;

3-[4-(4-chlorophenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-bromophenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-methylphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-methoxyphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-ethoxyphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

mbm.com

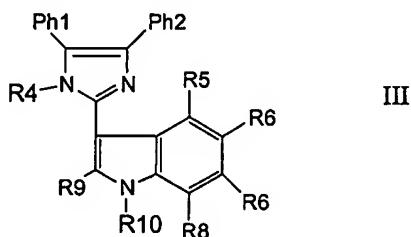
OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.[†]

* Limited Liability Partnership under the laws of Ontario / [†] Patent and Trademark Agents

3-[4,5-bis (4-methoxydiphenyl)-1H-imidazol-2-yl]-1-methyl-1H-indole;
4,4'-[2-(2-phenyl-1H-indol-3-yl)-1H-imidazole-4,5-diyl]bis[N,N-dimethyl]benzenamine;
4,4'-[2-(5-chloro-1H-indol-3-yl)-1H-imidazole-4,5-diyl]bis[N,N-dimethyl]benzenamine;
2-(3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
2-(3-indolyl)-4,5-bis[4-(diethylamino)phenyl]imidazole;
2-(2-phenyl-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
2-(2-chloro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
2-(2-ethylcarboxylate-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
2-(5-chloro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
2-(5-cyano-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
2-(5-nitro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
2-(5-ethylcarboxylate-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
and
when R4 to R9 are H, and R10 is CH3, then R2 and R3 are not both phenyl substituted at
para position with -CH=CH-COOH or -CH=CH-COO-*t*Bu; and
when R4 to R10 are H, and R3 is 4-methoxyphenyl, then R2 is not 3-indolyl.

23[18]. (Amended) A compound having the structural formula:



or a salt thereof, wherein:

Ph1 and Ph2 are independently selected from phenyl and substituted phenyl;

mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.†

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

R4, R5, R6, R7, R8 and R9 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

R10 is H, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, acyl;

with the proviso that the compounds are other than:

4,5-Bis(4-methoxyphenyl)-2-(3-indolyl)imidazole;

3-(4,5-diphenyl-1H-imidazol-2-yl)-1-methyl-1H-indole;

3-[4-(4-chlorophenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-bromophenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-methylphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-methoxyphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-ethoxyphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4,5-bis (4-methoxydiphenyl)-1H-imidazol-2-yl]-1-methyl-1H-indole;

4,4'-[2-(2-phenyl-1H-indol-3-yl)-1H-imidazole-4,5-diyl]bis[N,N-dimethyl]benzenamine;

4,4'-[2-(5-chloro-1H-indol-3-yl)-1H-imidazole-4,5-diyl]bis[N,N-dimethyl]benzenamine;

2-(3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(3-indolyl)-4,5-bis[4-(diethylamino)phenyl]imidazole;

2-(2-phenyl-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(2-chloro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(2-ethylcarboxylate-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(5-chloro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(5-cyano-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(5-nitro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(5-ethylcarboxylate-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

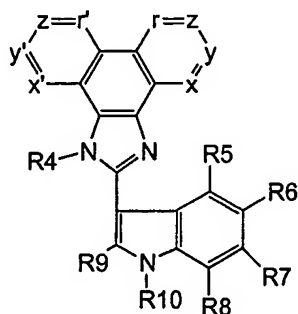
MARUSYK MILLER & SWAIN LLP* / MBM & Co.†

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

and

when R4 to R9 are H, and R10 is CH3, then Ph1 and Ph2 are not both phenyl substituted at para position with -CH=CH-COOH or -CH=CH-COO-*t*Bu.

24[19]. (Unchanged) A compound having the structural formula:



VI

or a salt thereof, wherein:

R4, R5, R6, R7, R8 and R9 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

R10 is H, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, acyl;

x is CR11 or N;

y is CR12 or N;

z is CR13 or N;

r is CR14 or N;

x' is CR15 or N;

y' is CR16 or N;

mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.[†]

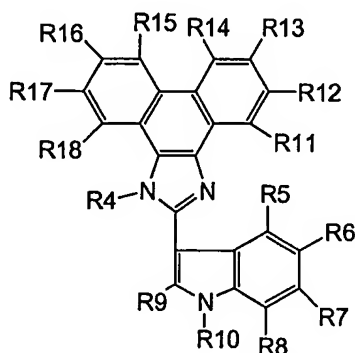
* Limited Liability Partnership under the laws of Ontario / [†] Patent and Trademark Agents

z' is CR17 or N;

x' is CR18 or N;

R11, R12, R13, R14, R15, R16, R17 and R18 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, alkenyl, alkenyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano.

25[20]. (Unchanged) A compound having the structural formula:



VII

or a salt thereof, wherein:

R4, R5, R6, R7, R8 and R9 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

R10 is H, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, acyl;

mbm.com

OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
 MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
 VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.†

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

R11, R12, R13, R14, R15, R16, R17 and R18 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, alkenyl, alkenyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano.

Remarks Relating to Article 19 Amendments

To aid the Examiner in the reviewing the amendments, the Applicant hereby submits the following remarks.

In amended claims 1, 2, 5, 6, 12, 13, 15, 16, 20 and 21, in the definitions of the moieties "R2 and R3", the phrase "form aryl or substituted aryl" has been replaced with "form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl" to correct a typographical error. Support for this amendment can be found on page 15, lines 8-11 of the application as originally filed.

The Applicant has taken care not to incorporate any new matter into this application by way of this amendment. We look forward to receiving confirmation that our request has been received and made of record.

Respectfully submitted,


MBM & Co.

EM/pt

Encl.

mbm.com

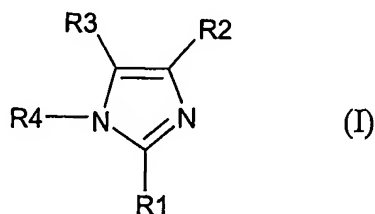
OTTAWA 270 Albert Street, 14th Floor | Ottawa, Ontario | K1P 5G8 | T: 613.567.0762 | F: 613.563.7671
MONTRÉAL 1010 Sherbrooke Street West, Suite 1800 | Montréal, Québec | H3A 2R7 | T: 514.284.0626 | F: 514.284.0482
VANCOUVER 200 Granville Street, 22nd Floor | Vancouver, British Columbia | V6C 1S4 | T: 604.669.4350 | F: 604.669.4351

MARUSYK MILLER & SWAIN LLP* / MBM & Co.[†]

* Limited Liability Partnership under the laws of Ontario / † Patent and Trademark Agents

**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:**

1. A compound having structural formula (I):



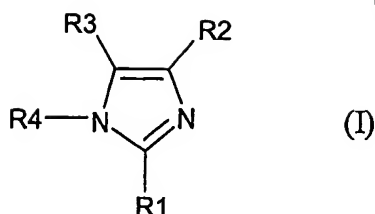
wherein:

R1 is aryl, substituted aryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano,
for use as an anti-microbial agent.

2. A compound having structural formula (I):



wherein:

R1 is heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl, and

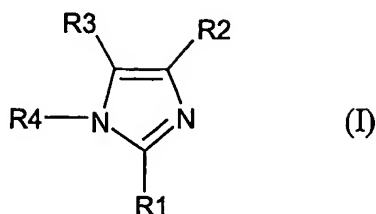
R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

for use as an anti-microbial agent;

with the proviso that when R1 is 3-indolyl or substituted 3-indolyl, and R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl then said compound is for use as an anti-fungal agent.

3. The compound according to claim 1 or 2, wherein said anti-microbial agent is for the treatment or prevention of a microbial infection in an animal in need thereof.
4. The compound according to claim 1 or 2, wherein said anti-microbial agent is formulated for incorporation into a cosmetic product, personal care product, cleanser, polish, paint, spray, soap, or detergent.

5. A compound having structural formula (I), or a salt thereof:



wherein:

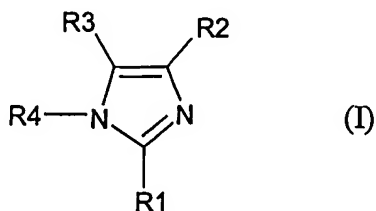
R1 is aryl, substituted aryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkylalkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

for use in the treatment or prevention of a microbial infection, or a disease or disorder associated therewith.

6. A compound having structural formula (I), or a salt thereof:



wherein:

R1 is heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl, and

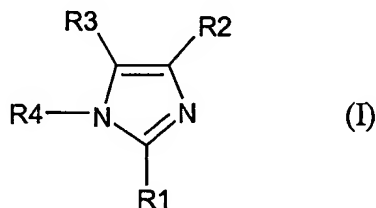
R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

for use in the treatment or prevention of a microbial infection, or a disease or disorder associated therewith;

with the proviso that when R1 is 3-indolyl or substituted 3-indolyl, and R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl then said microbial infection is a fungal infection.

7. The compound according to claim 5 or 6, wherein said compound of structural formula I is used in combination with one or more anti-microbial agent(s).
8. The compound according to any one of claims 5, 6 or 7, wherein said microbial infection, or disease or disorder associated therewith, is a bacterial infection, or disease or disorder associated therewith.
9. The compound according to any one of claims 5, 6 or 7, wherein said microbial infection, or disease or disorder associated therewith, is a fungal infection, or disease or disorder associated therewith.

10. The compound according to claim 8, wherein said bacterial infection, or disease or disorder associated therewith, is caused by *Corynebacterium xerosis*, *Chlamydia pneumoniae*, *Chlamydia trachomatis*, *Enterobacter cloacae*, *Enterobacter faecalis*, *Enterococcus faecium*, *Escherichia coli*, *Escherichia coli* O157:H7, *Haemophilus influenzae*, *Helicobacter pylori*, *Listeria monocytogenes*, *Moraxella catarrhalis*, *Neisseria gonorrhoeae*, *Neisseria meningitidis*, *Pseudomonas aeruginosa*, *Pneumococci* species, *Salmonella enterica*, *Salmonella typhimurium*, *Staphylococcus aureus*, *Staphylococcus aureus* K147, *Staphylococcus epidermidis*, *Staphylococcus typhimurium*, *Streptococcus mitis*, *Streptococcus pneumoniae*, *Streptococcus pyogenes*, *Vibrio cholerae*, *Mycobacterium tuberculosis*, *Mycobacterium africanum*, *Mycobacterium avium-intracellulare*, *Mycobacterium pneumoniae*, *Mycobacterium bovis*, *Mycobacterium leprae*, *Mycobacterium phlei* or *Bacillus anthracis*.
11. The compound according to claim 9, wherein said fungal infection, or disease or disorder associated therewith, is caused by *Histoplasma*, *Coccidioides*, *Blastomyces*, *Paracoccidioides*, *Cryptococcus*, *Aspergillus*, *Zygomycetes*, *Basidiobolus*, *Conidiobolus*, *Rhizopus*, *Mucor*, *Absidia*, *Mortierella*, *Cunninghamella*, *Saksenaea*, *Candida*, *Cryptosporidium parvum*, *Sporothrix schenckii*, *Piedraia hortae*, *Trichosporon beigeli*, *Malassezia furfur*, *Phialophora verrucosa*, *Fonsecae pedrosoi*, *Madurella mycetomatis* or *Pneumocystis carinii*.
12. Use of a compound having structural formula (I), or a salt thereof, in the preparation of an anti-microbial composition:



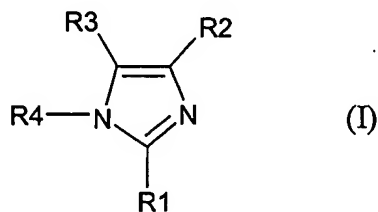
wherein:

R1 is aryl, substituted aryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano.

13. Use of a compound having structural formula (I), or a salt thereof, in the preparation of an anti-microbial composition:



wherein:

R1 is heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl;

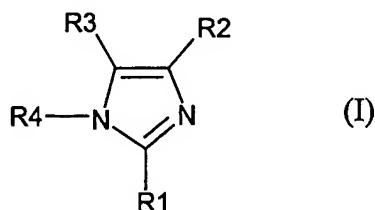
R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower

alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

with the proviso that when R1 is 3-indolyl or substituted 3-indolyl, and R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, then said anti-microbial composition is an anti-fungal composition.

14. The use according to claim 13, wherein said anti-microbial composition further comprises one or more anti-microbial agent(s).
15. A method of inhibiting the growth and/or proliferation of a microbial cell comprising contacting said microbial cell with an effective amount of a compound having general formula (I), or a salt thereof:



wherein:

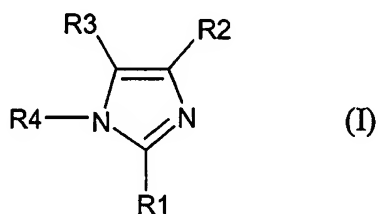
R1 is aryl, substituted aryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino,

amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano.

16. A method of inhibiting the growth and/or proliferation of a microbial cell comprising contacting said microbial cell with an effective amount of a compound having general formula (I), or a salt thereof:



wherein:

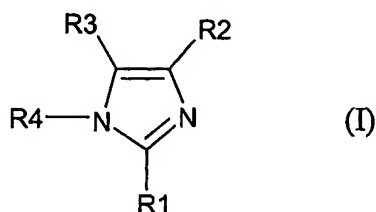
R1 is heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkylalkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

with the proviso that when R1 is 3-indolyl or substituted 3-indolyl, and R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, then said microbial cell is a fungal cell.

17. The method according to claim 15 or 16, further comprising contacting said cell with one or more anti-microbial agent(s).
18. The method according to any one of claims 15, 16 or 17, wherein said microbial cell is a bacterial cell.
19. The method according to any one of claims 15, 16 or 17, wherein said microbial cell is a fungal cell.
20. An anti-microbial composition comprising an effective amount of a compound having structural formula (I), or a salt thereof, and a carrier, diluent or excipient:



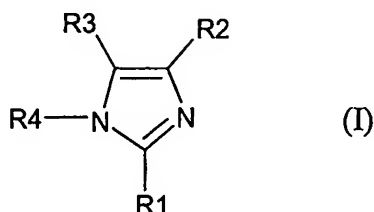
wherein:

R1 aryl, substituted aryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano.

21. An anti-microbial composition comprising an effective amount of a compound having structural formula (I), or a salt thereof, and a carrier, diluent or excipient:



wherein:

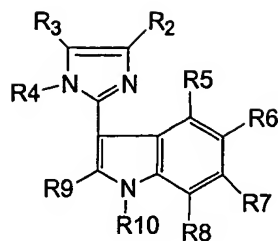
R1 is heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl;

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, and

R4 is hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

with the proviso that when R1 is 3-indolyl or substituted 3-indolyl, and R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl, substituted aryl, heterocycle, substituted heterocycle, heteroaryl, or substituted heteroaryl, then said anti-microbial composition is an anti-fungal composition.

22. A compound having the structural formula:



II

or a salt thereof, wherein:

R2 and R3 are independently aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl [or R2 and R3 when taken together along with the carbon atoms they are attached to, form aryl or substituted aryl, heterocycle, heteroaryl, substituted heterocycle, or substituted heteroaryl];

R4, R5, R6, R7, R8 and R9 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

R10 is H, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, acyl, -CH₂-aryl, -CH₂-heteroaryl;

with the proviso that the compounds are other than:

4,5-Bis(4-methoxyphenyl)-2-(3-indolyl)imidazole;

3-(4,5-diphenyl-1H-imidazol-2-yl)-1-methyl-1H-indole;

3-[4-(4-chlorophenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-bromophenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-methylphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-methoxyphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-ethoxyphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

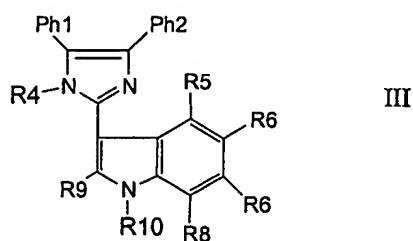
3-[4,5-bis (4-methoxydiphenyl)-1H-imidazol-2-yl]-1-methyl-1H-indole;

4,4'-[2-(4-phenyl-1H-indol-3-yl)-1H-imidazole-4,5-diyl]bis[N,N-dimethyl]benzenamine;
 4,4'-[2-(5-chloro-1H-indol-3-yl)-1H-imidazole-4,5-diyl]bis[N,N-dimethyl]benzenamine;
 2-(3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
 2-(3-indolyl)-4,5-bis[4-(diethylamino)phenyl]imidazole;
 2-(2-phenyl-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
 2-(2-chloro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
 2-(2-ethylcarboxylate-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
 2-(5-chloro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
 2-(5-cyano-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
 2-(5-nitro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
 2-(5-ethylcarboxylate-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;
 and

when R4 to R9 are H, and R10 is CH3, then R2 and R3 are not both phenyl substituted at para position with $-\text{CH}=\text{CH}-\text{COOH}$ or $-\text{CH}=\text{CH}-\text{COO}-t\text{-Bu}$;
 and

when R4 to R10 are H, and R3 is 4-methoxyphenyl, then R2 is not 3-indolyl.

23. A compound having the structural formula:



or a salt thereof, wherein:

Ph1 and Ph2 are independently selected from phenyl and substituted phenyl;
 R4, R5, R6, R7, R8 and R9 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido,

carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

R10 is H, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, acyl;

with the proviso that the compounds are other than:

4,5-Bis(4-methoxyphenyl)-2-(3-indolyl)imidazole;

3-(4,5-diphenyl-1H-imidazol-2-yl)-1-methyl-1H-indole;

3-[4-(4-chlorophenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-bromophenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-methylphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-methoxyphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4-(4-ethoxyphenyl)-5-phenyl-1H-imidazol-2-yl]-1-methyl-1H-indole;

3-[4,5-bis (4-methoxydiphenyl)-1H-imidazol-2-yl]-1-methyl-1H-indole;

4,4'-[2-(2-phenyl-1H-indol-3-yl)-1H-imidazole-4,5-diyl]bis[N,N-dimethyl]benzenamine;

4,4'-[2-(5-chloro-1H-indol-3-yl)-1H-imidazole-4,5-diyl]bis[N,N-dimethyl]benzenamine;

2-(3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(3-indolyl)-4,5-bis[4-(diethylamino)phenyl]imidazole;

2-(2-phenyl-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(2-chloro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(2-ethylcarboxylate-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(5-chloro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(5-cyano-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

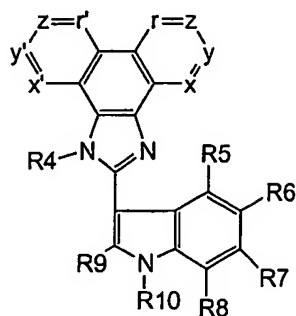
2-(5-nitro-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

2-(5-ethylcarboxylate-3-indolyl)-4,5-bis[4-(dimethylamino)phenyl]imidazole;

and

when R4 to R9 are H, and R10 is CH₃, then Ph1 and Ph2 are not both phenyl substituted at para position with -CH=CH-COOH or -CH=CH-COO-*t*-Bu.

24. A compound having the structural formula:



VI

or a salt thereof, wherein:

R4, R5, R6, R7, R8 and R9 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

R10 is H, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, acyl;

x is CR11 or N;

y is CR12 or N;

z is CR13 or N;

r is CR14 or N;

x' is CR15 or N;

y' is CR16 or N;

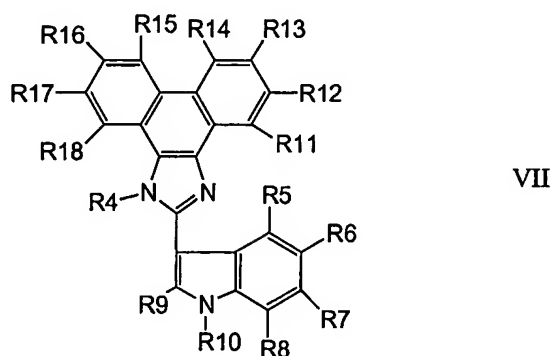
z' is CR17 or N;

x' is CR18 or N;

R11, R12, R13, R14, R15, R16, R17 and R18 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, alkenyl, alkenyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy,

amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano.

25. A compound having the structural formula:



or a salt thereof, wherein:

R4, R5, R6, R7, R8 and R9 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, lower alkenyl, substituted lower alkenyl, lower alkynyl, substituted lower alkynyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano;

R10 is H, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, acyl;

R11, R12, R13, R14, R15, R16, R17 and R18 are independently selected from hydrogen, halogen, hydroxyl, thiol, lower alkyl, substituted lower alkyl, alkenyl, alkenyl, alkylalkenyl, alkyl alkynyl, alkoxy, alkylthio, acyl, aryloxy, amino, amido, carboxyl, aryl, substituted aryl, heterocycle, heteroaryl, substituted heterocycle, heteroalkyl, cycloalkyl, substituted cycloalkyl, alkylcycloalkyl, alkylcycloheteroalkyl, nitro, or cyano.

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

☐ BLACK BORDERS

☒ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES

☐ FADED TEXT OR DRAWING

☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING

☐ SKEWED/SLANTED IMAGES

☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS

☐ GRAY SCALE DOCUMENTS

☐ LINES OR MARKS ON ORIGINAL DOCUMENT

☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY

☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.